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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,321	06/09/2006	Ingwer Carlsen	DE030412	5336
24737 7590 06/18/2009 PHILIPS INTELLECTUAL PROPERTY & STANDARDS P.O. BOX 3001 BRIARCLIFF MANOR, NY 10510				
EXAMINER				
RASHID, DAVID				
ART UNIT		PAPER NUMBER		
2624				
MAIL DATE		DELIVERY MODE		
06/18/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/596,321

**Applicant(s)**

CARLSEN ET AL.

**Examiner**

DAVID P. RASHID

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION*****Table of Contents***

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***General Information Matter***

[1] Please note, the instant Non-Provisional application (i.e., 10/596321) under prosecution at the United States Patent and Trademark Office (USPTO) has been assigned to Art Unit 2624. Please ensure, to aid in correlating any papers for 10/596321, all further correspondence regarding the instant application should be directed to Art Unit 2624.

[2] 10/596321 has been assigned to David Rashid in the Art Unit 2624 at the USPTO. To aid in correlating any papers for 10/596321, all further correspondence regarding the instant application should be directed to Examiner David Rashid in Art Unit 2624.

***Claim Status***

[3] Claims 1-9 pending.

***Priority***

[4] Receipt is acknowledged of papers submitted under 35 U.S.C. § 119(a)-(d) (EPO No. 03104644.4, filed Jun. 9, 2006), which papers have been placed of record in the file.

***Drawings***

[5] The following is a quote from 37 C.F.R. § 1.83(a):

The drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box). In addition, tables and sequence listings that are included in the specification are, except for applications filed under 35 U.S.C. 371, not permitted to be included in the drawings

**Details Not Shown**

The drawings are objected to under § 1.83(a) because they fail to show “memory corresponding to item 2 as described in the specification. See fig. 1, item 2 (depicting an empty box from which it cannot be determined that the box is correlated with memory as described in the specification).

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. See MPEP § 608.02(d).

[6] Corrected drawing sheets in compliance with 37 C.F.R. § 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 C.F.R. § 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Each claim begins with a capital letter and ends with a period. Periods may not be used elsewhere in the claims except for abbreviations. See Fressola v. Manbeck, 36 USPQ2d 1211 (D.D.C. 1995).

M.P.E.P. § 608.01(k).

#### **Incomplete Sentence**

**Claim 2** is objected to for not ending with a period.

### ***Claim Rejections - 35 U.S.C. § 112***

[7] The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 2-6** are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

#### **Failure to Particularly Point Out and Distinctly Claim**

Claim 2, line 8 cites “the second number” but it is unclear whether the second number is the second number of first landmarks selected, or the second number of second landmarks selected.

#### **Lack of Antecedent Basis**

Claims 2-6 recites the limitations. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 U.S.C. § 101***

[8] 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

#### **In Re Bilski – “Tied To” Criteria and/or Qualifying “Transformation”**

**Claims 1-7** are rejected under 35 U.S.C. § 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent<sup>1</sup> and recent Federal Circuit decisions<sup>2</sup> indicate that a statutory “process” under 35 U.S.C. § 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

With regard to (1) above, a process must have either a meaningful tie to an “apparatus”, or “machine”, or the process must perform a qualifying transformation. Insignificant pre- or post-solution activity involving an “apparatus” or “machine” is not a meaningful tie. For example, claim 1 does not involve a machine to consider whether the machine is significant to the inventive concept (and not pre- or -post processing, or intended use statements). In addition, when such machine is introduced and significant to the inventive concept, it must be a particular machine (e.g., a “processor”, not a “machine”).

With regard to (2) above, the images in claim 1 do not represent a physical object that has been physically transformed prior to.

Claims 2-7 are rejected for failing to alleviate the rejection of their respective dependents.

#### Functionally Descriptive Non-Statutory Subject Matter

The USPTO “Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility” (Official Gazette notice of 22 November 2005), Annex IV, reads as follows (see also MPEP 2106):

Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” In this context, “functional descriptive material” consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of “data structure” is “a physical or logical relationship among data elements, designed to support specific data manipulation functions.” The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) “Nonfunctional descriptive material” includes but is not limited to music, literary works and a compilation or mere arrangement of data.

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<sup>1</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

<sup>2</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

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When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

**Claim 9** is rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 9 defines a computer program embodying functional descriptive material (i.e., a computer program or computer executable code). However, the claim does not define a “computer-readable medium or computer-readable memory” and is thus non-statutory for that reason (i.e., “When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized” – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on “computer-readable medium” or equivalent; assuming the specification does NOT define the computer readable medium as a “signal”, “carrier wave”, or “transmission medium” which are deemed non-statutory (refer to “note” below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

“A transitory, propagating signal ... is not a “process, machine, manufacture, or composition of matter.” Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter.” *In re Nuijten*, 84 USPQ2d 1495 (Fed. Cir. 2007). Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a “signal”, the claim as a whole would be non-statutory. Should the applicant’s specification define or exemplify the computer readable medium or memory (or whatever language applicant

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chooses to recite a computer readable medium equivalent) as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a “signal”, “carrier wave”, or “transmission medium”, the examiner suggests amending the claim to include the disclosed tangible computer readable storage media, while at the same time excluding the intangible transitory media such as signals, carrier waves, etc.

Merely reciting functional descriptive material as residing on a “tangible” or other medium is not sufficient. If the scope of the claimed medium covers media other than “computer readable” media (e.g., “a tangible media”, a “machine-readable media”, etc.), the claim remains non-statutory. The full scope of the claimed media (regardless of what words applicant chooses) should not fall outside that of a computer readable medium.

### ***Claim Rejections - 35 U.S.C. § 102***

[9] The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

#### **Okazaki et al.**

[10] **Claims 1-4 and 8-9** are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pub. No. 2003/0206645 (published Nov. 6, 2003, hereinafter “Okazaki et al.”).

Regarding **claim 1**, *Okazaki et al.* discloses a method of registering a first image (e.g., fig. 10a) and a second image (e.g., fig. 10c), the method comprising the steps of:

selecting at least one first landmark (one “feature point” pixel of the right eye pupil in fig. 10a; “the central positions of these regions” at ¶0052; e.g., fig. 12a, item f2) in the first image (e.g., fig. 10a);



selecting at least one second landmark (one "feature point" pixel of the right eye in fig. 10c; "the central positions of these regions" at ¶0052; e.g., fig. 12a, item f2) in the second image (e.g., fig. 10c); and

registering the first and second images by using a similarity value (¶0054; using prior art detection methods for e.g., iris recognition would create similarity values between both irises in fig. 10a-b) which relates to a similarity of a first region (the feature point pixel itself or the iris pixels) in the first image (e.g., fig. 10a) determined by the at least one first landmark (one "feature point" pixel of the right eye pupil in fig. 10a; "the central positions of these regions" at ¶0052; e.g., fig. 12a, item f2) and a second region (the feature point pixel itself or the iris pixels) in the second image (e.g., fig. 10c) determined by the at least one second landmark (one "feature point" pixel of the right eye in fig. 10c; "the central positions of these regions" at ¶0052; e.g., fig. 12a, item f2);

wherein the at least one first landmark (one "feature point" pixel of the right eye pupil in fig. 10a; "the central positions of these regions" at ¶0052; e.g., fig. 12a, item f2) corresponds (corresponds in the sense they are both the center of an iris) to the at least one second landmark (one "feature point" pixel of the right eye in fig. 10c; "the central positions of these regions" at ¶0052; e.g., fig. 12a, item f2).

Regarding **claim 2**, *Okazaki et al.* discloses the method of claim 1, wherein, for the first image (e.g., fig. 10a) having a first number of dimensions (2-dimensional image), a second number of first landmarks (three landmarks; e.g., fig. 12, items f1-f3) is selected;

wherein, for the second image (e.g., fig. 10c) having the first number of dimensions (2-dimensional image), the second number of second landmarks (three landmarks; e.g., fig. 12, items f1-f3) is selected;

wherein the second number of first landmarks (three landmarks; e.g., fig. 12, items f1-f3) determine first vertices of first simplices for determining a third number of third regions (one region; e.g., the box in fig. 12b connected items f1-f3) in the first image (e.g., fig. 10a);

wherein the second number of second landmarks (three landmarks; e.g., fig. 12, items f1-f3) determine second vertices of second simplices for determining the third number of fourth regions (one region; e.g., the box in fig. 12b connected items f1-f3) in the second image (e.g., fig. 10c);

wherein the second number (three; e.g., items f1-f3) is the first number (2-dimensions) plus one;

wherein the first and second landmarks (three landmarks; e.g., fig. 12, items f1-f3) are selected in accordance with a qualifying function (both being identified by a prior art detection algorithm at ¶0054).

Regarding **claim 3**, *Okazaki et al.* discloses the method of claim 2, wherein, for each of the second number of second landmarks (three landmarks; e.g., fig. 12, items f1-f3), a local deformation field is determined for determining a first global deformation field (e.g., fig. 12, items f1-f3) which approximately describes a deformation (the deformation needed for e.g., fig. 10a to compare with fig. 10c) required to the first image for registration onto the second image.

Regarding **claim 4**, *Okazaki et al.* discloses the method of claim 3, wherein, for each of the third number of third regions (one region; e.g., the box in fig. 12b connected items f1-f3), a first similarity value is determined relating to a similarity between a respective one of the third regions (one region; e.g., the box in fig. 12b connected items f1-f3) to a respective corresponding one of the fourth regions (one region; e.g., the box in fig. 12b connected items f1-f3) by using the first global deformation field (e.g., fig. 12, items f1-f3).

Regarding **claim 8**, claim 1 recites identical features as in claim 8. Thus, references/arguments equivalent to those presented above for claim 1 are equally applicable to claim 8.

Regarding **claim 9**, claim 1 recites identical features as in claim 9. Thus, references/arguments equivalent to those presented above for claim 1 are equally applicable to claim 9.

### ***Claim Rejections - 35 U.S.C. § 103***

[11] The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[12] This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. § 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

*Okazaki et al. in view of Moshfeghi*

[13] **Claims 7** is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination between *Okazaki et al.* in view of U.S. Patent No. 5,633,951 (issued May 27, 1997, hereinafter "Moshfeghi").

Regarding **claim 7**, *Okazaki et al.* does not disclose wherein the method is applied in medical imaging to one of CT data sets, MRI data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets.

*Moshfeghi* teaches wherein an elastic volumetric registration method is applied in medical imaging to one of CT data sets, MRI data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets (4:9-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of *Okazaki et al.* to be applied in medical imaging to one of CT data sets, MRI data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets as taught by *Moshfeghi* "to provide a method for registering relatively deformed first and second volumetric images, at least one of which is obtained from an imaging modality, by extracting corresponding surfaces from the respective volumetric images and warping one of the extracted surfaces onto the other, and thereafter, elastically transforming the entire second volumetric image using local deformations determined as a function of local displacements of points on the warped surface." *Moshfeghi* at 2:46-54.

***Allowable Subject Matter***

[14] **Claims 5-6** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. § 112, 2nd paragraph; and 35 U.S.C. § 101 set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Reasons for Indicating***

[15] The following is a statement of reasons for the indication of allowable subject matter:

Regarding **claim 5**, while the prior art of record discloses the method of claim 4, the prior art of record does not teach wherein it is determined whether there is a fifth region of the third regions which first similarity value is less than a preset threshold value; wherein, when there is a fifth region, a third landmark is selected in the fifth region for determining third simplices in the fifth region which determine a plurality of sixth regions; wherein, when there is a fifth region, a fourth landmark is selected in a seventh region of fourth regions for determining fourth simplices in the seventh region which determine a plurality of eighth regions; wherein the third landmark corresponds to the fourth landmark such that the sixth regions correspond to the eighth regions; wherein, for each of the sixth regions, a second similarity value is determined relating to a similarity between a respective one of the sixth regions to a respective one of the eighth regions by using a second global deformation field which has been refined by using a further local deformation field of the third landmark.

Claim 6 allowed by dependency.

***Conclusion***

***Citation of Pertinent Prior Art***

[16] The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 5611000 A; US 5715166 A; US 5802220 A; US 6434278 B1; US 6456867 B2; US 20030048955 A1; US 6563941 B1; US 6580821 B1; US 6633686 B1; US 6718290 B1; US 6721450 B2; and US 6820043 B2.

[17] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578 and fax number (571)270-2578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/

Examiner, Art Unit 2624

/Bhavesh M Mehta/  
Supervisory Patent Examiner, Art Unit 2624

David P Rashid  
Examiner  
Art Unit 26244